

## Low voltage high speed switching NPN transistor

### Features

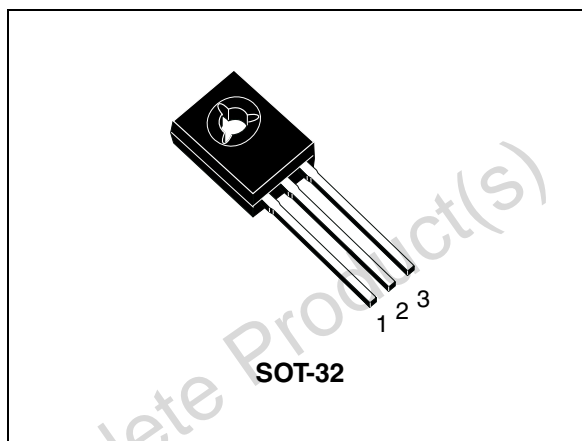
- High speed switching
- NPN device

### Applications

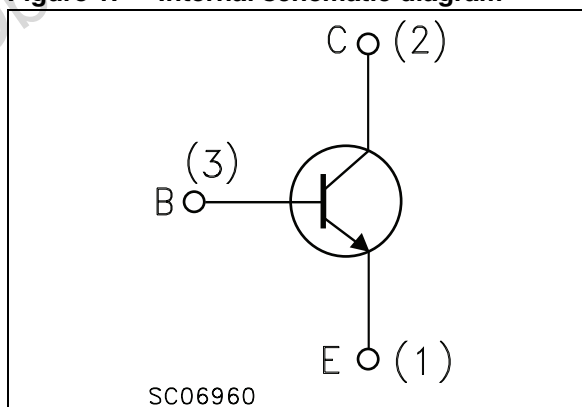
- Audio amplifier
- High speed switching applications

### Description

This device is an NPN low voltage transistor manufactured using epitaxial planar technology and housed in a SOT-32 plastic package. It is designed for low power audio amplifiers and low current, high speed switching applications.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
MJE172	MJE172	SOT-32	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	80	V
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	100	V
$V_{EBO}$	Base-emitter voltage ( $I_C = 0$ )	7	V
$I_C$	Collector current	3	A
$I_{CM}$	Collector peak current ( $t_P < 5$ ms)	6	A
$I_B$	Base current	1	A
$I_{BM}$	Base peak current ( $t_P < 5$ ms)	2	A
$P_{TOT}$	Total dissipation at $T_c \leq 25$ °C	12.5	W
$T_{stg}$	Storage temperature	-65 to 150	°C
$T_J$	Total power dissipation at $T_c \leq 25$ °C	150	

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJC}$	Thermal resistance junction-case max	10	°C/W
$R_{th-amb}$	Thermal resistance junction-ambient max	83.3	°C/W

## 2 Electrical characteristics

$T_{\text{case}} = 25\text{ °C}$  unless otherwise specified.

**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CBO}}$	Collector cut-off current ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = 100\text{ V}$ $V_{\text{CB}} = 100\text{ V}, T_{\text{c}} = 150\text{ °C}$			0.1 0.1	$\mu\text{A}$ $\text{mA}$
$V_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 7\text{ V}$			0.1	$\mu\text{A}$
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 10\text{ mA}$	80			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 50\text{ mA}$ $I_{\text{C}} = 1.5\text{ A}$ $I_{\text{B}} = 0.15\text{ A}$ $I_{\text{C}} = 3\text{ A}$ $I_{\text{B}} = 0.6\text{ A}$			0.3 0.9 1.7	V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 1.5\text{ A}$ $I_{\text{B}} = 0.15\text{ A}$ $I_{\text{C}} = 3\text{ A}$ $I_{\text{B}} = 0.6\text{ A}$			1.5 2	V V
$V_{\text{BE(on)}}^{(1)}$	Base-emitter on voltage	$I_{\text{C}} = 0.5\text{ A}$ $V_{\text{CE}} = 1\text{ V}$			1.2	V
$h_{\text{FE}}$	DC current gain	$I_{\text{C}} = 0.1\text{ A}$ $V_{\text{CE}} = 1\text{ V}$ $I_{\text{C}} = 0.5\text{ A}$ $V_{\text{CE}} = 1\text{ V}$ $I_{\text{C}} = 1.5\text{ A}$ $V_{\text{CE}} = 1\text{ V}$	50 30 12		250	
$f_{\text{T}}$	Transistor frequency	$I_{\text{C}} = 0.1\text{ A}$ $V_{\text{CE}} = 10\text{ V}$ $f = 10\text{ MHz}$	50			MHz
$C_{\text{CBO}}$	Collector-base capacitance ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = 10\text{ V}$ $f = 0.1\text{ MHz}$			60	pF

1. Pulse test: pulse duration  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 1.5\%$ .

### 3 Package mechanical data

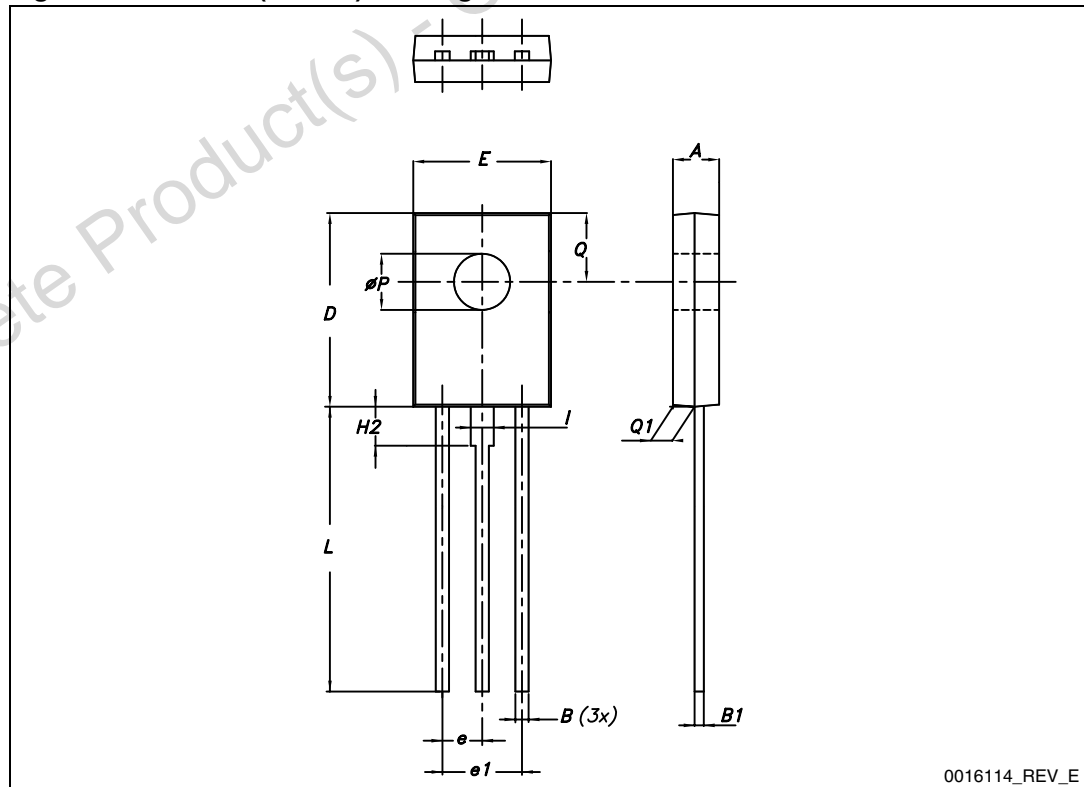
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Table 5. SOT-32 (TO-126) mechanical data

Dim.	mm.		
	Min.	Typ.	Max.
A	2.40		2.90
B	0.64		0.88
B1	0.39		0.63
D	10.50		11.05
E	7.40		7.80
e	2.04	2.29	2.54
e1	4.07	4.58	5.08
L	15.30		16
ØP	2.90		3.20
Q		3.80	
Q1	1		1.52
H2		2.15	
I		1.27	

Figure 2. SOT-32 (TO-126) drawing



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## 4 Revision history

**Table 6. Document revision history**

Date	Revision	Changes
22-Sep-2003	4	
08-Aug-2011	5	– Part number MJE172 has been moved to a separate datasheet. – Minor text changes

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